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EPA Superfund
Record of Decision:

NAVAL WEAPONS STATION EARLE (SITE A)
EPA ID: NJ0170022172
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COLTS NECK, NJ
09/28/1999

RECORD OF DECISION
OPERABLE UNIT 4 (OU-4)
Sites 14, 20, 22, 23, 24, 25, 27, and 29

NAVAL WEAPONS STATION EARLE
Colts Neck, New Jersey

Northern Division
Naval Facilities Engineering Command
Contract No. N62472-90-D-1298
Contract Task Order 300

August 1999

TETRA TECH NUS, INC.

R-51-12-8-1

RECORD OF DECISION
NAVAL WEAPONS STATION EARLE
OPERABLE UNIT 4

NAVAL WEAPONS STATION EARLE
Colts Neck, New Jersey

COMPREHENSIVE LONG-TERM
ENVIRONMENTAL ACTION NAVY (CLEAN) CONTRACT

Submitted to:
Northern Division
Environmental Branch, Code 14
Naval Facilities Engineering Command
10 Industrial Highway, Mail Stop #82
Lester, Pennsylvania 19113-2090

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RECORD OF DECISION
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NAVAL WEAPONS STATION EARLE
OPERABLE UNIT 4 (OU-4)
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PART I - DECLARATION

I. SITE NAME AND LOCATION

Naval Weapons Station Earle
Colts Neck, Monmouth County, New Jersey

II. STATEMENT OF BASIS AND PURPOSE

This Record of Decision (ROD) addresses Sites 14, 20, 22, 23, 24, 25, 27, and 29 [Operable Unit 4 (OU-4)] at the Naval Weapons Station (NWS) Earle Site, located in Colts Neck, New Jersey (Site). The location of NWS Earle is shown on Figure 1.

This ROD presents the consensus for the selection of No Further Action for Sites 14, 22, 24, 25, and 29 and Institutional Controls for sites 20, 23 and 27 at NWS Earle. It has been prepared in accordance with the Comprehensive Environmental Response, Compensation, and Liability Act of 1980 (CERCLA), as amended by the Superfund Amendments and Reauthorization Act of 1986 (SARA), and the National Oil and Hazardous Substances Pollution Contingency Plan (NCP). This decision document explains the factual and legal basis for selecting no further action or institutional controls for the above-referenced sites and is based on reports and other information contained in the Administrative Record file for Sites 14, 20, 22, 23, 24, 25, 27, and 29. The Administrative Record is available at the Monmouth County Library, Eastern Branch, Route 35, Shrewsbury, New Jersey.

The New Jersey Department of Environmental Protection (NJDEP) and the United States Environmental Protection Agency have commented on the selected remedy, and concur with the decision of no further action and institutional controls.

III. DESCRIPTION OF THE SELECTED REMEDY

No further remedial action is necessary for OU-4 sites 14, 22, 24, 25, and 29. Institutional controls (in the form of land use restrictions placed in the NWS Earle Master Plan) are required for sites 20, 23 and 27.

III. STATUTORY DETERMINATION

No further remedial action is necessary at sites 14, 22, 24, 25, and 29. Institutional controls, with five year reviews, meet statutory requirements of CERCLA 121 for sites 20, 23, and 27 which have contaminants remaining at concentrations above NJDEP residential reference criteria, but which do not pose excess risk under the current (industrial) land use.

V. DECLARATION STATEMENT

It has been determined that no further remedial action is necessary at sites 14, 22, 24, 25, and 29. Previous response action at the sites has eliminated the need to conduct additional remedial action. Data from the remedial investigation and subsequent sampling demonstrate that there is no unacceptable risk posed to human health and the environment from the sites comprising OU-4 under current or planned land use. However, NJDEP residential cleanup standards were not met for all compounds of concern at sites 20, 23 and 27. A notation has been placed in the NWS Earle facility Master Plan indicating that further measures would be required before sites 20, 23 and 27 could be considered for unrestricted (residential) use. Sites 20, 23, and 27 will be subject to five year reviews. In the event of full or partial transfer of property, through existing legislation or through future base closure authorization, a review would be conducted to determine the suitability of any parcel for transfer of ownership. Whether or not additional remediation is required, and whether formal restrictive covenants should be included in the transfer document, would be reviewed at that time. Property transfers must comply with applicable Federal statutes, including CERCLA.

9/28/99

Jeanne M. Fox
Regional Administrator
U.S. Environmental Protection Agency, Region II

Date

22 Sep 99

for R. M. Honey
Captain, U.S. Navy
Commanding Officer,
Naval Weapons Station Earle

Date

RECORD OF DECISION
NAVAL WEAPONS STATION EARLE
OPERABLE UNIT 4

PART II - DECISION SUMMARY

I. SITE NAME, LOCATION, AND DESCRIPTION

A. General

NWS Earle is located in Monmouth County, New Jersey, approximately 47 miles south of New York City. The station consists of two areas, the 10,248-acre Main Base (Mainside area), located inland, and the 706 acre Waterfront area (Figure 1). The two areas are connected by a Navy-controlled right-of-way.

The facility was commissioned in 1943, and its primary mission is to supply ammunition to the naval fleet. An estimated 2,500 people either work or live at the NWS Earle station.

The Mainside area is located approximately 10 miles inland from the Atlantic Ocean at Sandy Hook Bay in Colts Neck Township, which has a population of approximately 6,500 people. The surrounding area includes agricultural land, vacant land, and low-density housing. The Mainside area consists of a large, undeveloped portion associated with ordnance operations, production, and storage, this portion is encumbered by explosive safety quantity distance arcs. Other land use in the Mainside area consists of residences, offices, workshops, warehouses, recreational space, open space, and undeveloped land. The Waterfront area is located adjacent to Sandy Hook Bay in Middletown Township, which has a population of approximately 68,200 people. The Mainside and Waterfront areas are connected by a narrow strip of land which serves as a government-controlled right of way containing a road and railroad.

NWS Earle is located in the coastal lowlands of Monmouth County, New Jersey, within the Atlantic Coastal Plain Physiographic Province. The Mainside area, which includes OU-4, lies in the outer Coastal Plain, approximately 10 miles inland from the Atlantic Ocean. The Mainside area is relatively flat, with elevations ranging from approximately 100 to 300 feet above mean sea level (MSL). The most significant topographic relief within the Mainside area is Hominy Hills, a northeast-southwest-trending group of low hills located near the center of the station.

The rivers and streams draining NWS Earle ultimately discharge to the Atlantic Ocean, which is approximately 9 or 10 miles east of the Mainside area. The headwaters and drainage basins of three major

Coastal Plain rivers (Swimming, Manasquan, and Shark) originate on the Mainside area. The northern half of the Mainside is in the drainage basin of the Swimming River, and tributanes include Mine Brook, Hockhockson Brook, and Pine Brook. The southwestern portion of the Mainside drains to the Manasquan River via either Marsh Bog Brook or Mingamahone Brook. The southeastern comer of the Mainside drains to the Shark River. Both the Swimming River and the Shark River supply water to reservoirs used for public water supplies.

NWS Earle is situated in the Coastal Plain Physiographic Province of New Jersey. The New Jersey Coastal Plain is a seaward-dipping wedge of unconsolidated Cretaceous to Quaternary sediments that were deposited on a pre-Cretaceous basement-bedrock complex. The Coastal Plain sediments are primarily composed of clay, silt sand, and gravel and were deposited in continental, coastal. and marine environments. The sediments generally strike northeast-southwest and dip to the southeast at a rate of 10 to 60 feet per mile. The approximate thickness of these sediments beneath NWS Earle is 900 feet. The pre-Cretaceous complex consists mainly of PreCambrian and lower Paleozoic crystalline rocks and metamorphic schists and gneisses. The Cretaceous to Miocene Coastal Plain Formations are either exposed at the surface or subcrop in a banded pattern that roughly parallels the shoreline. The outcrop pattern is caused by the erosion truncation of the dipping sedimentary wedge. Where these formations are not exposed, they are covered by essentially flat-lying post-Miocene surficial deposits.

Groundwater classification areas were established in New Jersey under New Jersey Department of Environmental Projection (NJDEP) Water Technical Programs Groundwater Quality Standards in New Jersey Administrative Code (N.J.A.C.) 7:9-6. The Mainside area is located in the Class II-A: Groundwater Supporting Potable Water Supply area. Class II-A includes those areas where groundwater is an existing source of potable water with conventional water supply treatment or is a potential source of potable water. In the Mainside area, in general, the deeper aquifers are used for public water supplies and the shallower aquifers are used for domestic supplies.

OU-4 sites are situated in the recharge area of the Kirkwood-Cohansey aquifer system. The Kirkwood-Cohansey aquifer system is a source of water in Monmouth County and is composed of the generally unconfined sediments of the Cohansey Sand and Kirkwood Formation. The Kirkwood-Cohansey aquifer system has been reported in previous investigations as being used for residential wells in the Mainside area.

All facilities located in the Mainside Administration area are connected to a public water supply (New Jersey American Water Company). Water for the public supply network comes from surface water intakes, reservoirs, and deep wells. No public water supply wells or surface water intakes are located on the NWS Earle facility. A combination of private wells and public water supply from the New Jersey American Water

Company serves businesses and residences in areas surrounding the Mainside facilities. There are a number of-private wells located within a 1-mile radius of NWS Earle and several within the NWS Earle boundaries. The majority of these wells are used for potable supplies; previous testing for drinking water parameters indicates these wells have not been adversely impacted.

There is a rich diversity of ecological systems and habitats at NWS Earle. Knieskem's beaked-rush (Rvnchospora knieskernii), a sedge species on the federal endangered list, has been seen on the station, and some species on the New Jersey endangered list, such as the swamp pink (Helonias bullata), may be present. An osprey has visited Mainside and may nest in another area at NWS Earle. The Mingamahone Brook supports bog turtles downstream of the Mainside area and provides an appropriate habitat for them at the Mainside area.

Sites 14, 20, 22, 23, 24, 25, 27, and 29 are all located in the Mainside area (Figure 2 and Figure 2a). A brief description of each of these sites follows.

B. Site 14: Mercury Spill

The Defense Property Disposal Office Warehouse, Building C-33, is a 16,000-square-foot storage building for items awaiting processing (Figure 3). A small amount of mercury (estimated at from one to several ounces) was reportedly spilled inside the warehouse in 1970. The location of the spill was not documented: however, on-site interviews confirmed that the spill was inside the building.

C. Site 20: Grit Blasting Area at Building 544

The grit blasting area at Building 544 is a small area behind Building 544 that houses grit blasting operations for the removal of paint from ordnance (Figure 4). Activities at the site included the disposal of paint chips and spent grit from site operations. The spent grit was dumped in an open pile southwest of Building 544. A leaching field is present behind this building.

D. Site 22: Paint Chip Disposal Area

Site 22 is a former paint chip disposal area where waste sand blasting material and paint wastes were disposed (Figure 5). The site is located south of Building D-2 and previously consisted of approximately 50 square feet of stressed vegetation and discolored (black) soils. The discolored soils resulted from past grit blasting and painting operations. However, the discolored soils and stressed vegetation are no longer visible at the site.

E. Site 23: Paint Disposal Area

The paint disposal area near Building D-5 was used from the early 1970s until approximately 1993 for paint wastes from repainting and stenciling torpedoes, aerial bombs, and other large ordnance (Figure 6). The site consists of approximately 200 square feet of ground surface west of the northwestern comer of Building D-5 where paint disposal on the ground surface occurred.

F. Sites 24 and 25: Closed Pistol Ranges

Sites 24 and 25 are closed pistol ranges that were once used for target practice (Figure 7). Due to the sites' similar nature, history, and close proximity, they have been treated together. During target practice at the sites, lead- and copper-jacketed bullets were fired into 70-foot-high impact berms (natural sand banks). Preserved wooden posts at the sites formed the firing platform.

G. Site 27: Projectile Refurbishing Area

Site 27 includes Building E-14 and a small storage locker located off Oran Road (Figure 8). Projectiles are refurbished at the site by shot-blasting, repainting, and stenciling. Oil-contaminated rags, paint chips, and spent sandblasting shot were disposed behind the facility. A small portion of the site surface (approximately 80 square feet) near the southeast corner of Building E-14 was covered by red paint sludge.

H. Site 29: PCB Spill Site

This site is located in a former storage yard (north of Site 16/F) where an unknown quantity of polychlorinated biphenyl's (PCBs) spilled from a transformer in 1981 (Figure 9). No record exists suggesting that PCB compounds flowed any significant distance overland or in a ditch.

NWS Earle has built a one-story brick building at the site that functions as the new hazardous waste storage facility.

II. SITE HISTORY AND ENFORCEMENT ACTIVITY

Potential hazardous substance releases at OU-4were addressed in an Initial Assessment Study (IAS) in 1982, a Site Inspection Study (SI) in 1986, and a Phase I RI in 1993. These were preliminary investigations to determine the number of sources, compile histories of waste-handling and disposal practices at the site, and acquire data on the types of contaminants present and potentialhuman health and/or environmental receptors. RI investigations at OU-4 included the installation and sampling of monitoring wells; collection and analysis of surface and subsurface soils; excavation of test pits; and collection of surface water and sediment samples.

In 1990, NWS Earle was placed on the National Priorities List (NPL). This list includes sites where uncontrolled hazardous substance releases may potentially present serious threats to human health and the environment.

OU-4 was subsequently addressed by Phase II RI activities to determine the nature and extent of contamination. The Phase II RI was initiated in 1995 and completed in 1996.

The results of the RI and the remedial actions at the individual sites were used as the basis for determining that no further action was required for OU-4 sites 14, 22, 24, 25, and 29. Due to limited occurrence of compounds remaining at concentrations above NJDEP residential cleanup criteria, institutional controls with five year reviews are required for OU-4 sites 20, 23, and 27. The Navy and EPA, in consultation with NJDEP, developed this ROD which provides the basis for no further action or institutional controls at OU-4 sites.

III. HIGHLIGHTS OF COMMUNITY PARTICIPATION

The Navy encourages community participation in environmental issues at NWS Earle to comply with requirements of CERCLA 113(k)(2)(B)(1-v). The Navy sponsored a Technical Review Committee (TRC), consisting of representatives from the Navy, EPA, the NJDEP, the Monmouth County Health Department, and other agencies and local groups surrounding NWS Earle, prior to 1995 when the NWS Earle Restoration Advisory Board was formed. The TRC met on a regular basis to discuss Installation Restoration activities at NWS Earle. The TRC was transformed into the Restoration Advisory Board (RAB) in 1995 to include community members as well as the original officials from the TRC, and has been holding periodic meetings to maintain open lines of communication with the community and to inform all parties of current activities.

The documents that the Navy and EPA used to develop, evaluate, and select the no further remedial action alternative for OU-4 have been maintained at the Monmouth County Library (Eastern Branch), Route 35, Shrewsbury, New Jersey.

The Proposed Plan and other documents were released to the public on May 4, 1998. The notice of availability of these documents was published in the Asbury Park Press on May 8 and May 10, 1998. A public comment period was held from May 4, 1998 to June 12, 1998.

A public meeting was held during the public comment period at NWS Earle on May 14, 1998. At this meeting, representatives from the Navy and_EPA were available to answer questions about the Proposed Plan for OU-4. Results of the public meeting and public comment period are included in the Responsiveness Summary, which is Part III of this ROD.

IV. SCOPE AND ROLE OF OPERABLE UNIT 4

The Department of the Navy completed remedial investigations and focused remedial actions to address contamination associated with Sites 14, 20, 22, 23, 24, 25, 27, and 29 at NWS Earle. The focused remedial actions were either initial spill response (Sites 14 and 29) or removal of impacted soils. The results of these activities indicate that contamination associated with sites 14, 22, 24, 25, and 29 has been mitigated and no further remedial actions are necessary. Low concentrations of compounds remaining at sites 20, 23, and 27 at levels above the NJDEP residential cleanup criteria require that institutional controls (land use restrictions) be placed in the NWS Earle Master Plan for these four sites.

V. SITE CHARACTERISTICS

A. Site 14 - Mercury Spill Area

Site Background and Physical Setting

The Defense Property Disposal Office Warehouse, Building C-33, is a 16,000-square-foot storage building for items awaiting processing. On-site interviews indicated that a small amount of mercury (estimated to have totaled from one to several ounces) was spilled inside the warehouse in 1970 (IAS, 1983). The location of the spill was not documented. However, interviews confirmed that the spill was inside the building and that the mercury was removed by vacuuming.

The warehouse has solid concrete floors that would prevent the mercury spill from affecting the soil below the building. The floors of the warehouse have been coated witha concrete protective material since the spill, and it is unlikely that any residue from the spill remains. Materials are stored in a protected manner; thus the likelihood of environmental contamination is low.

Geology and Hydrogeology

Regional mapping places Site 14 within the outcrop area of the Kirkwood Formation. The Kirkwood Formation consists of gray and tan, very fine- to medium-grained quartz sand and dark-colored, micaceous, diatomaceous clay.

Groundwater conditions beneath the site could not be confirmed because no wells were installed at the site. However, groundwater in the Kirkwood and Vincentown aquifer beneath Site 23 (located approximately 3,000 feet southeast of Site 14), and presumably Site 14, occurs under unconfined conditions and the formations are interpreted to be hydraulically interconnected. The direction of shallow groundwater flow in the aquifer beneath Site 23, as indicated by both the August and October groundwater contour maps for Site 23, is toward the north-northeast.

Summary of Remedial Investigations

IAS

The IAS (1983) consisting of interviews, concluded minimal impact because clean-up action was taken at the time of the spill.

SI

No sampling was conducted within the Defense Property Disposal Warehouse during the SI because the location of the spill was not documented and the impact was judged to be minimal.

1995 Remedial Investigation

In December 1995, B&R Environmental conducted field investigations at Site 14 which included sampling and analysis of warehouse floor sweepings. Since the exact location of the spill is unknown, sweepings from different areas of the warehouse were collected to determine if any traces of mercury remained on the floor surface.

Floor sweepings were collected from five grab sample points and composited into one floor sweepings sample. Figure 3 depicts the locations of these grab samples in Building C-33. Mercury was detected at 8.6 mg/kg in the composite sample of floor sweepings.

Summary of Remedial Actions

The spill reportedly occurred on a solid concrete floor in an enclosed building with solid walls. The building has been maintained against the weather continuously since the spill. The spill was reportedly cleaned up using a vacuum.

Investigation confirms the interview reports. It appears as if the spill was adequately cleaned up at the time and no evidence of a wider environmental contamination or risk to human health was found.

B. Site 20 - Grit Blasting Area At Building 544

Site Background and Physical Setting

The grit blasting area at Building 544 is a small area behind Building 544 that houses grit blasting operations for the removal of paint from ordnance. Activities at the site included the disposal of paint chips and spent grit from site operations.

Spent grit from mine refurbishing grit blasting operations would typically contain lead and zinc from the coatings removed during blasting. An estimated yearly volume of 53 gallons of paint chips was disposed (IAS, 1983). The spent grit was dumped in an open pile southwest of Building 544. The pile was approximately 10 feet in diameter and 1 foot high. A leaching field is present behind this building. Past disposal activities at this leaching field are unknown.

The site is bordered on the northeast by a marsh and wetlands. A gravel road accesses the site from Midway Road. A shallow drainage depression, which is approximately 300 feet in length and 1 foot deep, runs along the eastern and southeastern boundaries of the site and discharges to the northeast toward the marsh. Surface water flows toward this marshy area. Figure 4 is a map of the site.

Geology and Hydrogeology

Regional mapping places Site 20 within the outcrop area of the Kirkwood Formation. The Kirkwood Formation ranges between 60 to 100 feet in thickness and consists of gray and tan, very fine- to medium-grained quartz sand and dark-colored, micaceous diatomaceous clay.

No monitoring wells were installed at Site 20 because the contaminants identified, metals in paint chips, were not expected to leach into the environment. However, soil boring samples from three borings at a depth of three to five feet in the area of the leach field were obtained and analyzed in the 1995 RI. Low levels of metals and organics, well below the corresponding NJDEP cleanup criteria, confirmed the assumption that groundwater is not likely to be impacted at this site. Groundwater in the Kirkwood and Vincentown aquifer beneath Site 10 (located approximately 1,000 feet north-northeast of Site 20), and presumably Site 20, occurs under unconfined conditions. The direction of shallow groundwater flow in the aquifer beneath Site 10, as indicated by both the August and October groundwater contour maps for Site 10, is toward the northwest, north, and north-northeast.

Summary of Remedial Investigations/Remedial Actions

IAS

The 1983 IAS, consisting of interviews and site observations, concluded minimal probable impact based on the presumption that metals in paint chips would not leach to the environment. The site was not recommended for a confirmation study.

SI

A site investigation (Confirmation Study) in 1986 consisted of four soil samples obtained from areas of grit deposition. Soil samples were analyzed for metals (EPTOX) and petroleum hydrocarbons. Analytical results from the 1986 SI indicated that no metals above EPTOX limits, and a maximum total petroleum hydrocarbons (TPH) of 65.7 mg/kg was found in site soil samples taken.

1993 RI/FS

During the 1993 RI/feasibility study (FS), five sediment (surface soil) samples were collected, one in the grit pile and four spaced along the drainage ditch which discharges to the northeast. The soil samples were analyzed for target analyte list (TAL) inorganics and cyanide. Two samples were also analyzed for

pesticides/PCBs and semivolatile organic compounds (SVOCs), and one sample was analyzed for volatile organic compounds (VOCs). Elevated levels of semivolatile compounds and metals were detected from samples along the drainage. Only very low levels of volatiles (possible laboratory artifacts) were detected in surface soil samples.

Remedial Action

A remedial action was performed at the site that consisted of removal and disposal of contaminated grit and related site media. The remedial action was executed in two stages. Stage one removal, in December 1994, consisted of excavation of approximately 300 cubic yards of grit tainted soils, which were stockpiled for sampling and off-site disposal. Figure 4 shows the approximate limits of excavation.

Post-excavation Stage One confirmation sampling consisted of 12 surface soil samples and duplicates analyzed for TAL metals and target compound list (TCL) semivolatile compounds. Sample analysis indicated metals residues remained at concentrations above NJDEP residential surface soil cleanup standards at three locations near the southern end of Site 20 (sample locations 2, 6, and 8).

On February 28, 1995, the Navy submitted a report entitled “Interim Remedial Action Report for Site 20" to the NJDEP for review and comment The NJDEP responded to this report on April 5, 1995 and indicated their concurrence with the Navy report and recommendations for additional excavation near sample locations 2, 6, and 8.

Stage two excavation, consisting of additional removal at locations with metals above NJDEP cleanup criteria, was carried out in March 1995. Stage two excavation was followed closely by the 1995 RI sampling to verify site cleanup results.

1995 Remedial Investigation

Based on previous investigations and removal actions, follow-up remedial investigation activities were developed to meet the following objectives:

- Determine the effectiveness of the removal action.
- Perform risk analysis to determine if further action is required.

- Determine if downgradient wetlands have been impacted.

- Evaluate potential impact from the leach field.

Between June and August 1995, B&R Environmental conducted field investigations at Site 20 that included sampling and analysis of surface soil, subsurface soil, sediment and the contents of the septic tank. Figure 4 depicts the sample locations.

1995 RI Nature and Extent of Contamination

Tables 1 and 2 present the occurrence and distribution of inorganic and organic chemicals (respectively) detected in surface soil samples at Site 20 and compare them to background. Tables 3 and 4 present a comparison of detected compounds to applicable or relevant and appropriate requirements (ARARs) and requirements to be considered (TBCs). Beryllium (up to 2.7 mg/kg) was the only compound detected above ARARs and TBCs. Figure 10 shows sample locations and concentrations of compounds that exceed ARARs and TBCs.

Tables 5 and 6 present the occurrence and distribution of inorganic and organic chemicals (respectively) detected in Site 20 background and site-related subsurface soil samples and compares them to background. Table 7 presents a comparison of detected compounds to ARARs and TBCs. No samples exceeded ARARs and TBCs. Figure 10 shows sample locations.

Tables 8 and 9 present the occurrence and distribution of inorganic and organic chemicals (respectively) detected in Site 20 background and site-related sediment samples. Tables 10 and 11 present a comparison of detected compounds to ARARs and TBCs. No compounds were detected at levels above ARARs and TBCs. Figure 10 shows sample locations.

One aqueous waste sample from the septic tank was collected at Site 20 to investigate if the compounds found in other site samplings are related to the septic tank as a possible source (Figure 4). Low levels of two semivolatile compounds were detected. Table 12 presents the analytical sample results.

C. Site 22 - Paint Chip Disposal Area

Site Background and Physical Setting

Site 22 is a former paint chip disposal area where waste sand blasting material and paint wastes were disposed. The site is located south of Building D-2.The ground surface at the site is predominantly sand and gravel. A macadam road services the site from Midway Road.

The site is bordered to the north by a railroad siding and to the east by a marshy area. A shallow drainage depression, measuring approximately 275 feet in length and 0.5 to 1 footin depth, runs the length of the site behind Building D-2, and discharges toward the southeast to a marsh. Figure 5 shows the site layout.

Geology and Hydrogeology

Regional mapping placed Site 22 in the outcrop area of the Kirkwood Formation; upper colluvium may be present at the site. The upper colluvium consists of massive sand and gravel and may contain quartz and ironstone pebbles. The Kirkwood Formation consists of gray and tan, very fine- to medium-grained quartz sand and dark-colored, micaceous, diatomaceous clay. The presence of upper colluvium or the Kirkwood Formation beneath the site cannot be confirmed because no soil borings were drilled at the site. However, the lithology of the sediments encountered in borings at Site 23, located approximately 700 feet north northwest of Site 20 generally agrees with the published description of the upper colluvium and the Kirkwood and Vincentown Formations.

Based on the findings of the IAS and SI, groundwater investigations were not considered needed at Site 22. Minimal potential for impact to site groundwater was concluded from the limited area (approximately 50 square feet) of the former disposal area, and the relatively immobile nature of metals associated in paint chips. Also, low-levels of heavy molecular weight PAH's observed in surface soils/sediments were viewed as unlikely to impact site groundwater. Groundwater in the Kirkwood and Vincentown aquifer beneath Site 23, and presumably Site 22, occurs under unconfined conditions and the formations are interpreted to be hydraulically interconnected. The direction of shallow groundwater flow in the aquifer beneath Site 23, as indicated by the August and October groundwater contour maps for Site 23, is toward the north-northeast.

Summary of Remedial Investigations

IAS

The 1983 IAS consisted of interviews and concluded minimal impact based on a small area (50 square feet) of stressed vegetation and discolored soil behind building D-2. The site was not recommended for a confirmation study.

SI

A site investigation (Confirmation Study) in 1986 consisted of four soil samples obtained from areas of stained soils at a depth of 0-3 feet. These soil samples were obtained in the general vicinity of the subsurface soil samples 22-007, 22-008 and 22-009 obtained during the RI in 1992 (see Figure 5). Soil samples were analyzed for TPH and EPTOX metals. Analytical results from the 1986 SI indicated that no metals above EPTOX limits, and a maximum TPH of 45.8 mg/kg were found in site soil samples taken.

1992 RI/FS

During the RI/FS (1993), six soil samples were collected at three locations designated as stained areas. Traces of paint stains were barely evident at the surface and were limited to black and red staining on the surface. The sample locations are identified as sample numbers 22-007, 22-008, and 22-009. Figure 5 shows the existing sample locations from the Paint Chip Disposal Area.

Three shallow samples (0 to 1ft bgs) were analyzed for TAL inorganics with cyanide, BNAs, and pesticides/PCBs. Three deep samples (approximately 2ft bgs) were analyzed for VOCs. Although several metals were detected at elevated concentrations, the concentrations of these metals were within the normal range for naturally occurring soils. Very low concentrations of volatile and semivolatile compounds were detected in some samples. The pesticide compound 4,4-DDT was found in one sample.

Six sediment samples (22-001 through 22-006) were collected in the drainage ditch south of Building D-2. Samples were analyzed for TAL inorganics. BNAs, TPH, and pesticides/PCBs. Several semivolatile derivative compounds of anthracene, pyrene, and chrysene were detected at elevated levels. Other semivolatile compounds were detected at estimated (J) levels. The pesticide compound 4,4-DDT was found in sample 22-003. Some metals were detected at slightly elevated levels, but were within the normal range for naturally occurring soils.

1995 Remedial Investigation

Based on limited investigations, follow-up remedial investigation activities were developed to meet the following objectives:

- Compare metals levels to background conditions.

- Perform risk analysis to determine if further action is required.

Sampling and analysis during previous investigations were biased toward areas of visible soil staining or discoloration. In addition, samples were obtained from drainageways from these areas to gauge the potential for off-site transport of compounds. No groundwater samples were obtained because the amount of waste disposed, based on observed residues on the soil, was considered to be minimal. Low levels of heavy molecular weight PAHs and phthalates found in site soils were assumed to have little potential for migration to groundwater.

Based on the lack of significant contamination noted in samples collected during previous investigations, no additional samples were collected at the site during this phase of investigation.

Nature and Extent of Contamination

Eight subsurface soil samples were collected including two duplicates at Site 22 (Figure 5) during the 1992 RI/FS. Tables 13 and 14 present the occurrence and distribution of inorganic and organic chemicals, respectively, in site-related subsurface soil samples and compare them to background values. Table 15 presents a comparison of detected compounds to ARARs and TBCs. No subsurface soil samples exceeded ARARs and TBCs. Figure 11 shows sample locations.

Seven sediment samples, including one duplicate were collected at Site 22 (Figure 5) during the 1992 RI/FS. Tables 16 and 17 present the occurrence and distribution of inorganic and organic chemicals, respectively, in site-related samples and compare them to background values. Table 18 presents a comparison of detected compounds to ARARs and TBCs. Cadmium (two locations), lead (one location), and PAHs (two locations) were detected at levels exceeding (ecological toxicity) ARARs and TBCs. Figure 11 shows sample locations and concentrations of compounds that exceed ARARs or TBCs.

Summary of Remedial Actions

Based on the results of the 1995 RI, a focused remedial action was performed at Site 22 to address specific areas of soil contamination. The results of this remedial action were summarized in a report entitled “Close-out Report - Removal Actions at Sites 22, 23, and 27" dated February 14, 1997.

The remedial action included excavation of contaminated soils in areas of known contamination. Figure 12 depicts the areas that were excavated. An area of approximately 38 feet by 50 feet by 1 foot deep was excavated on the western side of-Building D-2. An additional area, measuring approximately 16 feet by 4 feet was excavated to a depth of approximately 3 feet. Excavated soil was transported to R-3 Technologies (Morrisville, Pennsylvania) for disposal.

Approximately 250 tons of contaminated soil were excavated as part of this effort. At the completion of excavation activities and collection of confirmatory samples, the excavated areas were backfilled with clean fill to be level with the surrounding grade, and were re-vegetated.

Confirmatory samples were collected after soil excavation activities were complete. A total of 8 confirmatory samples were collected, including 6 soil samples from the sidewall of the excavation and 2 samples from the bottom of the excavation (Figure 12). Analytical results of the confirmatory soil samples are summarized in Table 19. NJDEP Soil Cleanup Criteria are also included on Table 19. Analytical results from the 8 confirmatory soil samples indicated that contaminant levels in all soil samples were below regulatory cleanup levels when compared with NJDEP Residential Direct Contact, Non-Residential Direct Contact, and Impact to Groundwater soil cleanup criteria. Based on these results, no further action was taken at Site 22.

D. Site 23 - Paint Disposal Area

Site Background and Physical Setting

The paint disposal area near Building D-5 was used from the early 1970s until approximately 1993 for paint wastes from repainting and stenciling torpedoes, aerial bombs, and other large ordnance. The site consists of approximately 200 square feet of ground surface west of the northwest corner of building D-5 where paint disposal to the ground surface reportedly occurred in the past (IAS).

Figure 6 is a map of the site. During 1993 Sl work at the site, a small amount of paint residue was present inside the fence line, southwest of Building D-5; no such residue was visible during an October 1993

preliminary RI site visit, nor was an area of bare ground evident. Consideringthe contradictory reports of where the "site" was, and the metals concentrations found in shallow soil samples taken, it seems likely that paint wastes may have been dumped anywhere on the ground near Building D-5 to the west or southwest. Documentation of past removal actions was not available.

The building D-5 complex is constructed into a naturally sloping hillside. Natural grade is higher to the north and east making a natural soil "berm" wall about 20 feet highon those sides. To the west and southwest, an earthen berm has been placed about 20 feet high to complete the soil berm enclosure of the D-5 complex on three sides. A drainage ditch is present west of the building,within the bermed area. A small wetland is located northwest and uphill of thebuilding, which appears to be the source of a small stream which runs intermittently in the drainage ditch west of Building D-5.

The site is partially paved, and overland runoff flows radially across the site into shallow drainage depressions that surround thesite on three sides. The drainage flows toward the southeast. A tributary of Hockhockson Brook is located approximately 500 feet southwest of the site. SI work indicated that a shallow perched-water layer may be present above the water-table aquifer at the site. Shallow groundwater generally flows toward the north-northeast.

Geology and Hydrogeology

Regional mapping places Site 23 in the outcrop area of the Kirkwood Formation; upper colluvium may be present at the site. The upper colluvium has a maximum thickness of 10 feet, the Kirkwood Formation ranges between 60 to 100 feet in thickness, and the soil borings are no more than 27 feet deep. Based upon the boring log descriptions. the wells penetrated the upper colluvium and the Kirkwood and Vincentown Formations.

Groundwater in the upper colluvium, Kirkwood, and Vincentown aquifer beneath the site occurs under unconfined conditions and the formations are interpreted to be hydraulically interconnected. Groundwater elevations for August 1995 and October 1995 are contoured on Figures 13 and 14, respectively. The direction of shallow groundwater flow in the aquifer, as indicated by both the August and October groundwater contour maps, is toward the north-northeast. There does not appear to be a significant seasonal variation in groundwater flow direction.

Based on boring log descriptions, the three monitoring wells installed in the 1995 RI (Figure 13) are screened across the contact between the Kirkwood and Vincentown Formations. The hydraulic conductivity's

calculated for MW23-01 and MW23-02 are 2.79 x 10^{3} cm/sec (7.91 ft/day) and 2.04 x 10^{-3} cm/sec (5.78 ft/day), respectively.

Summary of Remedial Investigations

IAS

The 1983 IAS, consisting of interviews and observations, concluded that a bare area of approximately 200 square feet had been used for paint disposal to surface soil. The site was not recommended for confirmation study because it was believed that the amount of paint dumped on the area was not enough to pose a significant environmental or public health hazard.

SI

During the 1993 SI, six soil samples (from 0 to 3 feet bgs), eight sediment samples, and one hydropunch groundwater sample were collected for analysis. Sample analysis indicated that low levels of VOCs and metals were present in soil samples, the highest levels of chromium and lead were detected in a soil sample taken west of Building D-5 in the vicinity of Rl soil boring 23 SB 04. Low levels of organics and one pesticide were detected in sediment, and elevated metals were detected in sediments. Groundwater contained low levels of organics and some elevated levels of metals.

The IAS concluded that surface soils had slight signs of staining from paint residues. Elevated levels of metals (mainly chromium and lead) at concentrations sometimes above regulatory guideline limits were found in soil and sediments. Elevated levels of lead and chromium were also found in groundwater samples. Low levels of organics were found in direct-push groundwater samples.

1995 Remedial Investigation

Based on previous investigations, follow-up remedial investigation activities were developed to meet the following objectives:

- Determine vertical extent of soil contamination in soil west of Building D-5.
- Determine whether surface water or wetland has been impacted by past practices.
- Investigate groundwater quality in the area of former paint dumping.

- Compare metals data to background levels and risk-based criteria.

- Determine impact of turbidity on metals results by using the low-flow sampling technique.

Between July and October 1995, B&R Environmental conducted the following field investigation activities at Site 23:

- Sampling and analysis of subsurface soil samples from three soil borings and one hand-auger boring

- Drilling and installation of three shallow permanent monitoring wells

- Sampling and analysis of groundwater from the wells

- Measurement of static water-levels in the wells

- Execution of slug tests in two of the wells

- Sampling and analysis of surface water and sediment

Nature and Extent of Contamination

Seven site-related subsurface soil samples (23 SB 01-04, 23 SB 01-16, 23 SB 02-02, 23 SB 02-16, 23 SB 03-06, 23 SB 03-14, and 23 SB 04-02) were collected at Site 23 (Figure 6). Tables 20 and 21 present the occurrence and distribution of inorganic chemicals detected in site-related subsurface soil samples and compare them to background. Tables 22 and 23 present a comparison of detected compounds to ARARs and TBCs. Cadmium (up to 1.5 mg/kg) slightly exceeded the NJDEP Residential and Non-Residential Soil Direct Contact standard of 1.0 mg/kg at one sampling location. Figure 13 shows sample locations and concentrations of compounds that exceed ARARs and TBCs.

Five sediment samples were collected at Site 23: 23 SD 01 through 23 SD 05 (Figure 6). Tables 24 and 25 present the occurrence and distribution of inorganic and organic chemicals in site-related sediment samples and compare them to background. Table 26 presents a comparison of detected compounds to ARARs and TBCs. Lead (72.5 mg/kg) and chromium (120 mg/kg) exceeded the sediment ecological toxicity threshold values of 47 mg/kg and 81 mg/kg, respectively at one location. PAHs were also detected above ARARs and

TBCs at one location. Figure 13 shows sample locations and concentrations of compounds that exceed ARARs and TBCs.

Three site-related groundwater samples (23 GW 01 through 23 GW 03) were collected at Site 23 (Figure 6). Tables 27 and 28 present the occurrence and distribution of inorganic and organic chemicals detected in site related groundwater samples and compare them to background. Table 29 presents a comparison of detected compounds to ARARs and TBCs. Several inorganic compounds were detected at levels above ARARs and TBCs. Figure 13 shows sample locations and concentrations of compounds that exceed ARARs and TBCs.

Three surface water samples were collected at Site 23: 23 SW 03 through 23 SW 05 (Figure 6). Tables 30 and 31 present the occurrence and distribution of inorganic and organic chemicals in site-related surface water samples. Table 32 presents a comparison of detected compounds to ARARs and TBCs. Figure 13 shows sample locations and concentrations of compounds that exceed ARARs and TBCs.

Summary of Remedial Actions

Based on the results of the 1995 RI, a focused remedial action was performed at Site 23 to address specific areas of soil contamination. The results of this remedial action was summarized in a report entitled “Closeout Report - Removal Actions at Sites 22, 23, and 27" dated February 14, 1997.

The remedial action included excavation of contaminated soils in areas of known contamination. Figure 14 depicts the areas which were excavated.

An area of approximately 18 feet by 3 feet by 2.8 foot deep was excavated on the southwestern side of Building D-5. Excavated soil was transported to R-3 Technologies (Morrisville, Pennsylvania) for disposal.

Approximately 86 tons of contaminated soil were excavated as part of this effort. At the completion of excavation activities and collection of confirmatory samples, the excavated areas were backfilled with clean fill to a level to match the surrounding grade and were re-vegetated.

Confirmatory samples were collected after soil excavation activities were complete. A total of 8 confirmatory samples were collected, including 6 soil samples from the sidewall of the excavation and 2 samples from the bottom of the excavation (Figure 14).

Analytical results of the confirmatory soil samples are summarized in Table 33. NJDEP Soil Cleanup Criteria are also included on Table 33.

Analytical results from the 8 confirmatory soil samples indicated that contaminant levels were generally below regulatory cleanup levels when compared with NJDEP Residential Direct Contact, Non-Residential Direct Contact, and Impact to Groundwater soil cleanup criteria. Thallium was the only contaminant which exceeded any of the soil cleanup criteria (Residential Direct Contact and Non-Residential Direct Contact).

Since the contaminated surface soil was removed and replaced by clean fill as part of the Site 23 remediation, the Impact to Groundwater soil cleanup criteria were deemed applicable. None of the 8 confirmatory soil samples exceeded the Impact to Groundwater soil cleanup criteria. Based on these results, no further action was taken at Site 23.

No remedial activities were performed for groundwater or sediments. A discussion of risk and recommended disposition of groundwater and sediments is presented in section VI - D - Summary of Site Risks for Site 23 (Pages II-33 — II-35).

E. Sites 24 and 25 - Closed Pistol Ranges

Site Background and Physical Setting

Sites 24 and 25 are closed pistol ranges that were once used for target practice. Due to the sites' similar nature, history, and close proximity, they have been treated together.

During target practice at the sites, lead- and copper-jacketed bullets were fired into 70-foot-high impact berms (natural sand banks). Preserved wooden posts at the sites formed the firing platform. No drainage swales or wetlands are on or near the sites (Figure 7).

Geology and Hydrogeology

Regional mapping places Sites 24 and 25 in the outcrop area of the Cohansey Sand; upland colluvium and gravel, undivided, may be present at the sites. The upland colluvium and gravel, undivided, has a maximum thickness of 10 feet the Cohansey Sand ranges between 0 and 30 feet in thickness, and the hand-auger borings at Sites 24 and 25 were no morethan 9 feet deep. The sediments encountered in the hand-auger borings generally agree with the published descriptions of the upland colluvium and gravel, undivided, and

the Cohansey Sand. In general, the borings encountered gray and brown medium- and coarse-grained sand and brown, medium- to coarse-grained sand.

Previous investigations concluded that lead from spent bullet projectiles (slugs) was the primary concern at Sites 24 and 25. Contaminant concentrations in samples taken from soil below the deepest slug penetration were below levels regulatory concern, confirming the assumption of no significant migration (of lead) to greater depths or groundwater. Groundwater in the Cohansey aquifer beneath Site 4, and presumably Sites 24 and 25, occurs under unconfined conditions. Site 4 is located about 1,300 feet south-southeast of Sites 24 and 25, The direction of shallow groundwater flow in the aquifer beneath Site 4, as indicated by both the August and October groundwater contour maps for Site 4, is toward the east and east-southeast.

Summary of Remedial Investigations

IAS

The 1983 IAS, consisting of interviews and visual inspection, concluded minimal impact. The site was not recommended for a confirmation study.

SI

Four soil samples were collected from shallow soil borings from the berms behind the target areas. during the 1993 Sl field activities. The samples were collected from approximately 3 feet bgs. Lead slugs were removed from the material before the samples were sent for analysis. Soil samples were analyzed for lead. zinc, copper, chromium, and cadmium. Analysis indicated that lead was the primary metal of concern at the site.

1995 Remedial Investigation

Based on previous investigations, follow-up remedial investigation activities were developed to meet the following objectives:

- Determine the extent of penetration and the density of projectiles in the impact areas.

- Perform ecological risk assessment.

In August 1995, B&R Environmental conducted the following field investigation activities at Sites 24 and 25:

- The total number of lead slugs (bullets) was counted, in 6-inch-depth intervals, at two locations at each site.

- Subsurface soil samples from two borings at each site were sampled and analyzed.

Nature and Extent of Contamination - Site 24

Four site-related subsurface soil samples (24 SB 01-05, 24 SB 01-08, 24 SB 02-03, and 24 SB 02-06) were collected at Site 24 (Figure 7). Table 34 presents the occurrence and distribution of inorganic chemicals detected in site-related subsurface soil samples and compares them to background. Tables 35 and 36 present a comparison of detected compounds to ARARs and TBCs. No compounds were detected above ARARs or TBCs.

Nature and Extent of Contamination - Site 25

Four site-related subsurface soil samples (25 SB 01-05, 25 SB 01-08, 25 SB 02-03, and 25 SB 02-06) were collected at Site 25 (Figure 7). Table 37 presents the occurrence and distribution of inorganic chemicals detected in Site 25 background and site-related subsurface soil samples. Tables 38 and 39 present a comparison of detected compounds to ARARs and TBCs. No compounds were detected above ARARs or TBCs.

Summary of Remedial Actions

The results of previous remedial investigations recommended removal of bullets and shell casings from Sites 24 and 25. A focused remedial action was later performed at Sites 24 and 25 to remove bullets and shell casings from each site. The remedial action involved mechanical separation of the metal bullets from the sandy impact berms and subsequent washing of the soils.

As part-of the remedial action, approximately 1,500 tons of soil were processed from the sites. A total of 10 tons of bullets was recovered as part of this effort.

The bullets were sold to a local metal recycler. Lead-containing sludge from the soil washing system was sent to an asphalt batch plant for recycling. The washed soils were backfilled at each site and the wash water was discharged to the Station's wastewater treatment plant for final processing.

Table 40 summarizes the results of confirmatory soil samples collected after excavation of the berms and firing lines were complete. Table 41 summarizes the results of samples collected of the washed soils. Results show lead levels below regulatory criteria.

F. Site 27 - Projectile Refurbishing Area

Site Background and Physical Setting

Site 27 includes Building E-14 and a small storage locker located off Oran Road (Figure 8), Projectiles are refurbished at the site by shot-blasting, repainting, and stenciling. Oil-contaminated rags, paint chips, and spent sandblasting shotwere disposed behind the facility (IAS, 1983). A small portion of the site surface (approximately 80 square feet) near the southeast corner of Building E-14 was covered by red paint sludge.

A railroad siding and small drainage depression exist on the east side of the site behind the building. Overland runoff drains towards the southeast to the shallow depression approximately 15 feet downslope from the paint sludge area. Surface water infiltration occurs within the drainage depression. The east branch of the Mingamahone Brook is located approximately 1200 to 1500 ft east-southeast of the site.

Geology and Hydrogeology

Regional mapping places Site 27 within the outcrop area of the Kirkwood Formation. The Kirkwood Formation ranges between 60 and 100 feet in thickness and the soil borings are no more than 12 feet deep. The lithology of the sediments encountered in the on-site soil borings generally agrees with the published description of the Kirkwood Formation. The borings encountered light brown, pebbly, fine-grained sand with varying amounts of clay and silt.

Based on the findings of the IAS and SI, groundwater investigations were not considered needed at Site 27. Minimal potential for impact to site groundwater was concluded from the limited size (approximately 80 square feet) of the former disposal area, and the relatively immobile nature of metals associated in paint chips, Also, low levels of heavy molecular weight SVOC's and PCB's observed in shallow soil samples were viewed as unlikely to affect groundwater. Groundwater in the Kirkwood Formation beneath Sites 3 and 26, and presumably Site 27, occurs under unconfined conditions. Site 3 is located about 3.200 feet south-southeast and Site 26 is located about 3,000 feet north of the site, The direction of shallow groundwater flow in the aquifer beneath Site 3, as indicated by the August groundwater contour map for Site 3. is toward the

southeast. The direction of groundwater flow in the aquifer beneath Site 26, as indicated by both the August and October groundwater contour maps for Site 26, is toward the southwest.

Summary of Remedial Investigations

IAS

The 1983 IAS, consisting of interviews, concluded that the approximately eighty cubic feet of paint chips and blast shot posed no significant threat to the environment or public health because the material was considered relatively inert. The site was not recommended for a confirmation study.

SI

The 1993 SI field activities included collection of ten soil samples and eight sediment samples, Two soil samples (at 0 to 0.5 ft bgs and 0.5 to 1.5 ft bgs) were collected atfive different locations concentrated in the area of observed soil staining behind Building E-14. Shallow soils encountered within the zone were disturbed in places and composed of red brown gravelly sand with some stag, sand blasting material, and paint chips. Analysis of soil samples detected elevated concentrations of metals, PCBs, and semivolatiles. The eight sediment samples were collected within the drainage ditch between the railroad tracks located behind Building E-14 and one sediment sample was collected to the east of the main railroad track in a dry drainage depression. Low concentrations of metals and pesticides and trace levels of SVOCs were detected in several sediment samples.

1995 Remedial Investigation

Based on previous investigations, follow-up remedial investigation activities were developed to meet the following objectives:

- Determine vertical extent of soil contamination.
- Compare data to background levels and risk based criteria.
- Using all data collected to date, determine whether wetlands, or surface water has been impacted,

In December 1995, B&R Environmental conducted the following field investigation activities at Site 27:

- Sampling and analysis of subsurface soil samples from two soil borings
- Sampling and analysis of subsurface soil samples from one hand-augured boring

Nature and Extent of Contamination

Nine subsurface soil samples were collected at.Site 27 (Figure 8). Tables 42 and 43 present the occurrence and distribution of inorganic and organic chemicals in site-related smples and compare them to background values. Tables 44 and 45 present a comparisonof detected compounds to ARARs and TBCs. Cadmium was the only compound detected at levels above ARARs and TBCs. Figure 15 shows sample locations and concentrations of compounds that exceed ARARs and TBCs.

Summary of Remedial Actions

Based on the results of the 1995 RI, a focused remedial action was performed at Site 27 to address specific areas of soil contamination. The results of this remedial action were summarized in a report entitled “Close-out Report - Removal Actions at Sites 22, 23, and 27" dated February 14, 1997.

The remedial action included excavation of contaminated soils in areas of known contamination. Figure 16 depicts the areas which were excavated.

An irregular-shaped area approximately 200 feet by 100 feet by 1 foot deep was excavated. Excavated soil was transported to R-3 Technologies (Morrisville, Pennsylvania) for disposal.

Approximately 54 tons of contaminated soil were excavated as part of this effort. At the completion of excavation activities and collection of confirmatory samples, the excavated areas were backfilled with clean fill to a level to match the surrounding grade, and re-vegetated.

Confirmatory samples (27-CS01 through 27-CS08) were collected after soil excavation activities were complete. Eight confirmatory soil samples were collected, including 6 soil samples from the sidewall of the excavation and 2 samples from the bottom of the excavation (Figure 16). Analytical results from the 8 initial confirmatory soil samples indicated contaminant levels that exceeded NJDEP Residential Direct Contact and Non-Residential Direct Contact soil cleanup criteria.

A second soil excavation, to remove additional soils based on the lead concentration results of the first round of (eight) confirmatory soil samples, was performed (Figure 16 shows the areas of excavation). Table 46 shows the results of the second round (27-CS09 and 27-CS10) confirmatory soil samples. It appears that lead contaminated soils were effectively removed by the remedial action. However, other metals (including arsenic, beryllium, cadmium, copper, antimony, selenium and thallium) remain at concentrations above NJDEP residential cleanup levels.

Since the contaminated surface soil was removed and replaced by clean fill and top soil planted in native grasses as part of the Site 27 remediation, the potential for direct contact has been blocked. Based on these results, no further remedial action was taken at Site 27.

G. Site 29 - PCB Spill Site

Site Background and Physical Setting

This site is located in a storage yard (north of Site 16/F) where an unknown quantity of PCBs spilled from a transformer in 1981. No record exists suggesting that PCB compounds flowed any significant distance overland or in a ditch. Within 5 days after the spill, all discolored soil (over 120 cubic feet) was disposed off-site. NWS Earle has constructed a one-story, brick building at the site that functions as the new hazardous waste storage facility. A railroad spur and wetlands are located east of the site, and Saipan Road is located along the western side. Figure 9 is a site map.

Geology and Hydrogeology

Regional mapping places Site 29 within the outcrop area of the Kirkwood Formation; upper colluvium may be present at the site. The upper colluvium has a maximum thickness of 10 feet, the Kirkwood Formation ranges between 60 to 100 feet in thickness,and the soil borings installed for the two monitoring wells are no more than 42 feet deep. The lithology of the sediments encountered in the on-site borings generally agrees with the published descriptionof the upper colluvium and the Kirkwood Formation. In general, the borings encountered fill material, olive gray and brown, silty, fine- to coarse-grained sand with gravel (possibly representative of the upland gravel) and yellowish-brown and olive, pebbly, silty, fine- to coarse-grained sand and sandy clay (probably representative of the Kirkwood Formation).

Based upon the boring log descriptions, well MW29-01 penetrated fill material and the Kirkwood Formation, and well MW29-02 penetrated the upland gravel and the Kirkwood Formation.

Groundwater in the Kirkwood aquifer beneath the site occurs under unconfined conditions. There are insufficient data points to contour the water table beneath Site 29; however, the elevational data from both August and October 1995 indicate a westward component to shallow groundwater at the site. There does not appear to be a significant seasonal variation in groundwater flow direction.

Summary of Remedial Investigations

IAS

The 1983 IAS, consisting of interviews and site observations, noted that there was a PCB spill, Reportedly, all visible evidence of the spill was removed in an immediate removal action. The site was not recommended for a confirmation study.

SI

During the 1992 SI field investigation, five soil samples (from 0.5 to 1.5 feet bgs) were collected from the area of the PCB spill at Site 29. Samples were obtained within the relatively small area labeled "approximate location of PCB spill" on Figure 9. Minor amounts of pesticides and PCBs were detected at concentrations below New Jersey clean-up standards. One sample contained high concentrations of TPH (28,000 mg/kg).

As part of the environmental site evaluation for the proposed hazardous waste storage facility, additional field work was performed at the site. To further evaluate the possible impacts from past activities and to assess subsurface soil conditionsfor foundation design, seven soil borings were completed at the site in mid-1993 (Haley & Aldrich, Incorporated, 1993). All 1993 soil borings and monitoring wells were installed within the area labeled "new hazardous waste storage facility under construction" shown on Figure 9. Soil borings were completed to depths ranging from 17 to 42 feet bgs and were sampled at 5 and 10 feet bgs. Six of the seven soil borings were converted to monitoring wells. Trace levels of VOCs, semivolatiles, pesticides. and PCBs were detected in the soils, all below New Jersey subsurface soil criteria. Groundwater samples indicated that trace to low levels of VOCs and semivolatiles were present, and no detectable concentrations of pesticides or PCBs were present. Elevated levels of benzene (30 ppb) and DCE (25 ppb) were reported in former well MW29-04. Total lead and total chromium were present in groundwater at levels above state criteria.

Four of the six wells were formally closed on 26 July 1995 in conjunction with construction of the new facility. Two of the wells were capped for future use.

Storage Building Construction

Soil was removed for construction of the new hazardous waste storage facility to a depth of approximately 8 feet below grade in the entire area labeled "new hazardous waste storage facility under construction" (figure 9) before 1995 Rl field activities were carded out. Due to dry conditions, no groundwater was encountered in the excavation. The excavated soil was stockpiled and composite samples were collected and analyzed to determine disposal options. The soil was found to be non-hazardous. The results of these Samples are summarized in Table 47. These soils, along with an additional 6000 yd of previously stockpiled non-hazardous soils were subsequently placed under the landfill cap at Installation Restoration Site #5 to aid in the proper grading of the capped site.

The original removal action apparently was effective in removing spilled PCBs.

1995 Remedial Investigation

Based on previous investigations and removal actions, follow-up remedial investigation activities were developed to meet the following objectives:

- Investigate subsurface soil quality downgradient of the former site.
- Confirm groundwater quality downgradient of the former site.
- Perform risk analysis to determine if further action is required.

Between July and October 1995, B&R Environmental conducted the following field investigation activities at site 29:

- Sampling and analysis of subsurface soil samples from two soil borings
- Drilling and installation of two shallow permanent monitoring wells
- Sampling and analysis of groundwater from the wells
- Measurement of static water levels in the monitoring wells

Nature and Extent of Contamination

Two site-related subsurface soil samples (29 SB 01-02 and 29 SB 02-02) were collected at Site 29 (Figure 9). Table 48 presents the occurrence and distribution of organic chemicals detected in site-related subsurface soil samples and compares them to background. Tables 49 and 50 present a comparison of detected compounds to ARARs and TBCs. No exceedences of ARARs and TBCs were recorded. Figure 17 shows sample locations.

Two site-related groundwater samples (29 GW 01 and 29 GW 02) were collected (Figure 9). Tables 51 and 52 present the occurrence and distribution of inorganic chemicals detected in site-related groundwater samples and compare them to background. Table 53 presents a comparison of detected compounds to ARARs and TBCs. Aluminum, iron, and manganese were detected at levels above ARARs or TBCs. Figure 17 shows sample locations and concentrations of compounds which exceed ARARs and TBCs.

At the time of the original PCB spill from a transformer in 1981, all discolored soil (over 120 cubic feet) was removed and disposed off site. Subsequent sampling in the vicinity of the reported spill, and later in downgradient soils and groundwater confirm that the original removal action for PCBs in 1981 was effective.

VI. SUMMARY OF SITE RISKS

A. Site 14 - Mercury Spill Area

The concentration of mercury in the composite sample of floor sweepings (8.6 mg/kg) was below New Jersey State standards for Residential Direct Contact Soil Cleanup Criteria for mercury (14 mg/kg). Although this site is inside an industrial facility, it should be noted that the EPA value for residential levels of mercury in soil at a hazard index (HI) of 1 is 7.8 mg/kg (EPA Region III Risk-Based Concentration Table, October 1998).

The mercury found in floor sweepings at Building C-33 represents no apparent health threat. The mercury concentration found in floor sweepings is lower than the concentration in soil (which could be tracked in on the shoes of workers or on the tires. of handling equipment) and would be considered protective of non-residential or even lifetime residential exposure under NJDEP clean-up criteria. The corresponding EPA residential screening level at an HI of 1 (7.8 mg/kg) is approximately equal to the concentration found (8.6 mg/kg) and would be considered protective of human health. The industrial worker exposure scenario (current most probable exposure scenario) would have a correspondingly lower exposure, based on time at work (250 days/year, 8 hours/day) compared to full time resident children and adults (350 dayslyear). Therefore, it is concluded the mercury found in floor sweepings at Building C-33 represents no apparent

health threat for current or future potential exposure scenarios. Details about assumptions made in calculating human health risk are presented in Section 2.4.3 (page 2-37) of the Remedial Investigation Report for Naval Weapons Station Earle, Volume IA - Text (Brown & Root Environmental 1996) and are based on U.S. EPA risk assessment guidance (EPA, 1989a: EPA, 1991a).

There is no known evidence that the mercury spill may have affected the area around building C-33.

B. Site 20 - Grit Blasting Area at Building 544

Human Health Risk Assessment (Post Remedlation)

As part of the Phase II RI, a human health risk assessment and ecological risk assessment were performed. Tables 54 through 56 provide the selected chemicals of potential concern (COPCs) and representative concentrations of inorganics and organics in site-related surface soil, subsurface soil, and sediment, respectively. Exposure pathways, potential receptors, uncertainties, and conclusions are included.

The conservative baseline risk assessment resulted in an HI greater than a value of 1.0 for non-cancer nsk; therefore, additional risk analysis was performed according to EPA guidance.

The identified potential receptors were evaluated on the basis of current land use (industrial employee) and hypothetical future land use (residential, recreational, and industrial receptors).

Estimated carcinogenic risks and non-carcinogenic hazard quotients (HQs) are summarized in Tables 57 through 66.

Conclusions of Human Health Risk Assessment

Surface soil, subsurface soil, and sedimentwere sampled at Site 20. The potential receptors for this site were current industrial, future industrial and residential, and recreational receptors. The cancer risks associated with the future residential and current industrial (surface soil) exposure scenarios were within the mid-range of the target risk range. Arsenic (via ingestion of and dermal contact with surface soil) was the major COPC that contributed to these cancer risks. The non-carcinogenic HIs associated with the current industrial (surface soil) and future residential (surface soil) exposure scenarios were less than 1.0; the cutoff point below which adverse non-carcinogenic effects are not expected to occur. Lead soil concentrations were below EPA guidelines. These lead concentrations are not expected to be associated with significant

increases in blood-lead levels based on the results of the Integrated Exposure Uptake Biokinetic Model (IEUSK) Lead Model (v. 0.99).

Risk characterization results (total cancer risks and total non-carcinogenic HIs) are presented for all potential receptors at Site 20 in Table 67 for surface soil, subsurface soil, and sediment.

The major uncertainties in the estimation of human health risks at Site 20 stem from estimated risks calculated for arsenic via dermal contact and oral ingestion, and in both cases result in overestimation of these risks. The uncertainty associated with dermal exposure is high because the dermal toxicity values used for arsenic (and other compounds) are based on default oral absorption factors (no dermal toxicity slope factors are available). Carcinogenicity of arsenic via ingestion is not confirmed by available empirical data. However, EPA has proposed an oral unit risk factor that was used in estimating this risk. Since arsenic is the major contributor to risk remaining at Site 20 after cleanup, risks may be overestimated. A more complete discussion of these effects is presented in Section 2.4.3 (page 2-37) of the Remedial Investigaton Report for Naval Weapons Station Earle, Volume IA - Text.

Ecological Risk Assessment (Post Remediation)

The ecological risk assessment estimated the risk posed to ecological receptors, such as aquatic and terrestrial biota, from contamination at Site 20.

Site 20 is mostly developed and contains minimal terrestrial habitat. A drainage depression drains the entire site, but is small with ephemeral flow, and hence, provides no aquatic habitat. The surrounding areas contain some wetland habitats. Nearby wooded areas also provide excellent upland habitats. Groundwater-to-surface water contaminant migration is unlikely, but runoff from Site 20 to the wetlands east of the site is possible via the drainage depression.

Although the drainage depression contains no aquatic habitat, four sediment samples were collected in the depression and one in the grit area in the southeastern section of the site during 1993 RI/FS activities to ascertain whether contaminants are migrating off-site. Elevated levels of several metals, including chromium, copper, nickel, lead, and zinc, were detected in drainageway sediments. Several SVOCs, including some polycyclic aromatic hydrocarbons (PAHs), were detected in the grit area sample. However, the grit area and contaminated areas in the drainage depression were removed in 1994.

A sediment sample was taken where the drainage depression exits the site during 1995 RI activities. No excavation has occurred in this area. Due to topography, all runoff exits the site via this pathway, the

sediment sample was taken in this area to determine possible off-site migration to the wetlands. Surface soil samples were collected at the site, but were taken in areas that contain limited terrestrial habitat (former grit storage areas). However, potential contaminant runoff from these soils should collect inthe drainage ditch and, therefore, be present in drainage depression sediments. Concentrations of inorganics in this sediment sample were low, with all concentrations similar to background. Some PAHs were present in this sample, but were also present in low concentrations. The low levels of inorganics and organics where the drainage depression exits the site suggest limited off-site contaminant migration. Since both the site and the drainage depression are relatively small, and since the potential contaminant source has already been removed, future off-site migration would most likely be limited. For these reasons, quantitative ecological risk assessment at this site was considered notapplicable (since any risk numbers would be mitigated by the factors discussed above). Potential risks to ecological receceptors at Site 20 are considered to be low, and the site was excluded from quantitative ecological risk assessment.

Summary of Risks

The human health risk assessment indicates that there is no present or future scenario of carcinogenic risk above the target acceptable range. The comparison of COPCs with corresponding Hls exceeding 1, to background concentrations, indicates that this site is within the range of background risk or lower,

The removal action appears to have been effective since metals concentrations in soils were determined to be within the range of background. Low levels of inorganics and organics where the drainage depression exits the site suggests limited off-site contaminant migration at a level of potential ecological concern. However, since both the site and the drainage depression are relatively small, and since the potential contaminant source has already been removed, future off-site migration would most likely be limited.

C. Site 22 - Point Chip Disposal Area

As part of the 1995 RI, a human health risk assessment and ecological risk assessment were performed. Tables 68 and 69 provide the selected COPCs and representative concentrations of inorganics and organics in site-related subsurface soil and sediment. respectively. Exposure pathways, potential receptors, uncertainties, and conclusions are included.

Human Health Risk Assessment (Pro-Remediation)

The identified potential receptors were evaluated on the basis of current land use (industrial employee) and hypothetical future land use (residential, recreational, and industrial receptors). Estimated carcinogenic risks and non-carcinogenic HQs are summarized in Tables 70 through 78.

The human health risk assessment concluded that the total RME cancer risk associated with the future residential (subsurface soil) exposure scenario was approximately 1E-04; within the target risk range.

The RME cancer risk associated with the future industrial (subsurface soil) exposure scenario was approximately 5E-05; within the target acceptable risk range. The cancer risk associated with the future recreational (sediment) exposure scenario via ingestion and dermal contact was below 1E-06. Arsenic (via ingestion of and dermal contact with subsurface soil) was the major COPC that contributed to the cancer risk for the future residential receptor and the future industrial receptor exposure scenarios.

Non-carcinogenic HQs associated with the future residential and future industrial (subsurface soil) exposure scenarios and the future recreational (sediment) exposure scenario were below 1.0; the cutoff point below which adverse effects are not expected to occur.

Lead concentrations detected at the site were below the EPA guidelines are not expected to be associated with significant increases in blood-lead levels based on the results of the IEUBK Lead Model (v. 0.99).

The risk assessment procedure resulted in the elimination of all COPCs with calculated risk above target guideline limits. Arsenic could not be eliminated from consideration because it is a class A carcinogen.

Risk characterization results (total RME cancer risks and non-carcinogenic HIs) are presented for all potential receptors at Site 22 in Table 77. Table 78 presents the relevant central tendency risk estimates associated with potential receptors at Site 22.

The major uncertainties in the estimation of human health risks at Site 22 stem from estimated risks calculated for arsenic via dermal contact and oral ingestion, and in both cases result in overestimation of these risks, The uncertainty associated with dermal exposure is high because the dermal toxicity values used for arsenic (and other compounds) are based on default oral absorption factors (no dermal toxicity slope factors are available). Carcinogenicity of arsenic via ingestion is not confirmed by available empirical data. However, EPA has proposed an oral unit risk factor that was used in estimating this risk. Since arsenic is the major contributor to risk remaining at Site 22 after cleanup, risks may be overestimated. A more complete discussion of these effects is presented in Section 2.4.3 (page 2-37) of the Remedial Investigation Report for Naval Weapons Station Earle. Volume IA - Text.

Ecological Risk Assessment (Pre-Remediation)

Ecotox threshold (ET) values were used for screening potential ecological risks from contaminated sediments and surface soil. Sediment and surface soil ET values are presented in Table 18.

Site 22 provides only limited habitat of relatively poor ecological value, while the swamp to the south provides excellent wetland habitat. Most of the swamp is wooded, and hence, provides habitat primarily for terrestrial and semi-aquatic receptors. A drainage swale runs along the inside border of the berm and receives all overland flow in the area. The swale exits the site and runs southeast along the railroad tracks. A small tributary of Hockhockson Brook runs through the swamp and connects with the drainage swale several hundred feet southeast of the site. Runoff of contaminants to the swamp is precluded by the berm that surrounds most of the site, but runoff may exit the site via the swale. Groundwater-to-surface water contaminant migration in the wetlands is unlikely due to the presumed direction of groundwater flow.

Summary of Risks

The remedial investigation concluded that limited removal of contaminated soils and sediments near the building would preclude migration of potentially ecotoxic compounds to downstream ecological receptors.

The focused removal was completed and analytical results from the 8 confirmatory soil samples indicate that contaminant levels in all soil samples are below regulatory cleanup levels when compared with NJDEP Residential Direct Contact, Non-Residential Direct Contact, and Impact to Groundwater soil cleanup criteria. Based on these results, no further action was taken at Site 22 and no further remedial actions are necessary.

D. Site 23 - Paint Disposal Area

A human health risk assessment and ecological risk assessment were performed. Tables 79 through 82 provide the selected COPCs and representative concentrations of inorganics and organics in site-related subsurface soil, sediment groundwater, and surface water, respectively. Exposure pathways, potential receptors, uncertainties, and conclusions are included.

Human Health Risk Assessment (Pro-Remediation)

The result of the conservative first level screening (baseline) risk assessment was greater than a value of 1.0 for non-cancer risk and greater than 1E-04 for cancer risk; therefore, additional risk analysis was performed according to EPA guidance.

The identified potential receptors were evaluated on the basis of current land use (industrial employee) and hypothetical future land use (residential, recreational, and industrial receptors).

Estimated carcinogenic risks and non-carcinogenic HQs are summarized in Tables 83 to 103.

The human health risk assessment concluded that RME cancer risks associated with future industrial (subsurface soil and groundwater) and future residential (subsurface soil and groundwater) exposure scenarios exceeded 1E-04, the upper end of the target risk range. Only unfiltered groundwater sample results were used to calculate estimated risks. Arsenic (via ingestion of and dermal contact with groundwater and subsurface soil) was the major COPC that contributed to the cancer risks for these exposure scenarios.

The corresponding central tendency (CTE) calculation of estimated risks shows that cancer risks are more likely to be in the mid-range of the target acceptable range for the future industrial and at the upper end of the target acceptable risk range for the future residential exposure scenario.

RME estmates for non-carcinogenic HIs associated with future industrial (groundwater) and future residential (subsurface soil and groundwater) exposure scenarios exceeded 1.0; the cutoff point below which adverse non-carcinogenic effects are not expected to occur. Chromium, cadmium, iron, and arsenic (chiefly via ingestion of groundwater) were the COPCs that exceeded 1.0 or contributed to the HI exceeding 1.0 for these exposure scenarios.

Lead was detected in groundwater at concentrations (up to 50.1ug/L) greater than the EPA drinking water guideline (MCL - 15ug/L) and the NJDEP GWQS (4.00ug/L). Based on the results of the IEUBK Lead Model (v. 0.99), the maximum detected soil (9.8 ppm) and groundwater (50.1 ug/l) concentrations might be expected to be associated with significant increases in blood-lead levels (i.e., above 10 ug/dL) in 6.8 percent of children from a population exposed under similar conditions. This slightly exceeds the EPA guideline of no more than 5 percent of the population exhibiting elevated blood-lead levels.

Risk characterization results (total cancer risks and total non-carcinogenic HIs) are presented for all potential receptors at Site 23 in Table 104 for subsurface soil. sediment, groundwater, and surface water. Table 105 presents the relevant central tendency risk estimates associated with potential receptors for subsurface soil and groundwater.

Ecological Risk Assessment (Pre-Remediation)

Ecotox threshold (ET) values were used for screening potential ecological risks from contaminants in surface water and sediments. Surface water and sediment ET values are presented in Tables 106 and 107, respectively.

The ecological risk assessment determined that potential risks to ecological receptors from contaminants detected in surface water and sediment samples taken as part of the 1995 RI were relatively low.

Since potential risks to ecological receptors at Site 23 appear to be low and off-site contaminant migration is minimal, further study or remediation based on ecological risk concerns at the site appear to be unnecessary.

Summary of Risks

After soil remediation, no human health risk assessment was performed. Further action decisions were made based on NJDEP cleanup guidelines. Analytical results from the 8 confirmatory soil samples indicated that contaminant levels were generally below regulatory cleanup levels when compared with NJDEP Residential Direct Contact, Non-Residential Direct Contact, and Impact to Groundwater soil cleanup criteria. Thallium was the only contaminant that exceeded any of the soil cleanup criteria (Residential Direct Contact and Non-Residential Direct Contact). Since the remedial action included removal of soil followed by backfill with clean fill and revegetation, the remaining marginal exceedence for direct contact (residential exposure scenario) does not apply. There is no direct contact and there is no residential use anticipated. None of the 8 confirmatory soil samples exceeded the Impact to Groundwater soil cleanup criteria. Based on these results, no additional action was taken at Site 23 for soils and no further remedial actions are necessary. Institutional controls in the form of a notation on the facility master plan for Site 23 have been implemented to limit future use of the site for residences.

Human health risk assessment indicates estimated potential risk in excess of EPA guidelines remain from groundwater at Site 23. Shallow groundwater samples obtained at the water table (14 to 27 feet below grade) contained low levels of organics (mainly residual pesticides) and relatively high concentrations of inorganics (metals). Concentrations of organics were not a concern for human health risk assessment. Only metals concentrations resulted in exceedences of EPA guideline acceptable risk guidelines for estimated cancer risks and non-cancer risks.

There are extenuating factors to be considered when trying to assess potential impacts from Site 23 groundwater. Groundwater samples were collected using dedicated low-flow gas-actuated bladder pumps

following EPA guidelines for low flow sampling. However, despite hours spent at each well trying to obtain low turbidity samples, final sampling endpoint turbidity values of samples obtained at Site 23 were all high (787 NTU, 457 NTU, and 871 NTU). These high turbidity results indicate suspended solids (containing metals) are in the sample, and therefore, the sample is not representative of dissolved-phase metals in the groundwater. Filtered samples from the same sampling event showed only limited metals (cadmium and arsenic) at lower concentrations.

Considering the high turbidity sample analytical results used for human health risk assessment estimation calculations, the shallow depth of groundwater sampled (no production well for human consumption would be installed at such a shallow depth). the current industrial-use-only restrictions for the site on the weapons station Master Plan, and the fact that source area metals have been remediated; the project team (Navy and the regulatory community) has concluded that no further action for Site 23 groundwater is indicated at this time.

E. Sites 24 and 25 - Closed Pistol Ranges

A human health risk assessment and ecological risk assessment were performed. Tables 108 and 114 provide the selected COPCs and representative concentrations of inorganics in site-related subsurface soil for Sites 24 and 25, respectively. Exposure pathways, potential receptors, uncertainties, and conclusions are included.

Human Health Risk Assessment (Pre-Remediation)

Risk Assessment Summary - Site 24

The potential receptors for this site were future industrial and residential receptors. Tables 109 through 112 summarize carcinogenic risks and non carcinogenic HQs for Site 24.

The cancer risk associated with the future residential (subsurface soil) exposure scenario was approximately 6E-05, in the middle of the target risk range. Arsenic (via ingestion of and dermal contact with subsurface soil) and beryllium (via dermal contact with subsurface soil) were the major COPCs that contributed to the cancer risk for this exposure scenario. The non-carcinogenic HQs associated with the future industrial and future residential (subsurface soil) exposure scenarios were below 1.0; the cutoff point below which adverse effects are not expected to occur.

Lead concentrations at the site were detected at concentrations that are not expected to be associated with significant increases in blood-lead levels based on the results of the IEUBK Lead Model (v. 0.99). Risk

characterization results (total cancer risks and total non-carcinogenic HIs) are presented for all potential receptors at Site 24 in Table 113 for subsurface soil.

Risk Assessment Summary - Site 25

The potential receptors for this site were future industrial and residential receptors. Tables 115 through 118 summarize carcinogenic risks and non carcinogenic HQs for Site 25.

The cancer risk associated with the future residential (subsurface soil) exposure scenario was approximately 4E-05, near the middle of the target risk range. Arsenic (via ingestion of and dermal contact with subsurface soil) and beryllium (via dermal contact wiih subsurface soil) were the major COPCs that contributed to the cancer risk for this exposure scenario. The non-carcinogenic HIs associated with the future industrial and residential (subsurface soil) exposure scenario were below 1.0, the cutoff point below which adverse non-carcinogenic effects are not expected to occur.

Lead concentrations at the site were detected at concentrations that are not expected to be associated with significant increases in blood-lead levels based on the results of the IEUBK Lead Model (v. 0.99).

Risk characterization results (total cancer risks and total non-carcinogenic HIs) are presented for all potential receptors at Site 25 in Table 119 for subsurface soil.

Ecological Risk Assessment (Pre-Remediation)

The areas inside the firing ranges are primarily exposed soil with little vegetation, precluding the existence of significant ecological habitat. Excellent upland habitats are present surrounding the sites, and a wide variety of terrestrial wildlife is expected to use these areas. However, runoff of contaminants to off-site habitats is partially limited by berms surrounding the sites, and no drainageways from the site are present. In addition, groundwater contaminant discharge to surface water is not likely since no surface waters are present near Sites 24 and 25.

Sl soil-samples from the impact berms contained low levels of some metals, including cadmium, chromium, lead, copper, and zinc. The results of Rl subsurface soil sampling indicate the presence of some inorganic contaminants, but concentrations were similar to background concentrations. Contaminant levels in samples taken below the deepest slug penetration were below levels of regulatory concern, suggesting no migration to groundwater. There are no significant contaminant migration pathways to the upland areas that surround the sites, and no migration pathways into the Hockhockson Brook Watershed. Quantitative ecological risk

assessment was not applicable at Sites 24 and 25 since any risk numbers would be mitigated by the factors discussed above. Hence, potential risks to ecological receptors appear insignificant and the site was excluded from quantitative ecological risk.

Summary of Risks

Confirmatory soil samples, collected after excavation, sifting and washing soils from the berms and firing lines, indicate site risks have been mitigated by the soil remediation. Results shown in Table 40 and Table 41 demonstrate lead levels below regulatory criteria, therefore, no further remedial action is necessary for Sites 24 and 25.

F. Site 27 - Projectile Refurbishing Area

A human health risk assessment and ecological risk assessment were performed.

Table 120 provides the selected COPCs and representative concentrations of inorganic and organics in site-related subsurface soil.

Human Health Risk Assessment (Pre-Remediation)

The identified potential receptors have been evaluated on the basis of hypothetical future land use (residential receptors and industrial receptors). Tables 121 through 125 summarize the RME Carcinogenic risks and the RME non-carcinogenic risks associated with Site 27.

The results of the human health risk assessment determined that the RME cancer risk associated with the future residential (subsurface soil) exposure scenario is greater than 1E-04; the upper end of the target risk range. Arsenic (via ingestion of and dermal contact with soil) is the major COPC that contributed to this cancer risk. Central tendency risk estimation calculations show that cancer risks are more likely to be within the mid-range of the target acceptable risk range.

The RME cancer risk associated with the future industrial (subsurface soil) exposure scenario was approximately 4E-05, within the target acceptable risk range. RME non-carcinogenic Hls associated with the future residential and future industrial (subsurface soil) exposure scenarios were below 1.0, the cutoff point below which adverse effects are not expected to occur.

Lead soil concentrations at the site were below EPA guidelines and are not expected to be associated with significant increases in blood-lead levels based on the results of the IEUBK Lead Model (v. 0.99).

Pre-remediagon risk characterization results (total RME cancer risks and total RME non-carcinogenic HIs) are presented for all potential receptors at Site 27 in Table 126 for subsurface soil. Table 127 presents the relevant pre-remediation central tendency risk estimates associated with future residential receptors for subsurface soil.

It must be noted that the objective of this study was not to perform a site-wide characterization. Samples taken in the RI (1995) were biased, based on previous sampling, toward the area of known contamination to delineate vertical migration for contaminants for remedial design considerations. The use of only the 1995 RI data for calculations of pre-remediation estimated risk could have biased the human health risk assessment.

Ecological Risk Assessment (Pre-Remediation)

Ecotox threshold (ET) values were used for screening potential ecological risks from contaminated sediments; Sediment ET values are presented in Table 128.

The site consists of a gravel-covered parking area in the vicinity of buildings, railroad tracks, and a paved road. Therefore, limited ecological habitat exists on the site. The wooded area to the east provides excellent upland habitat and is most likely used by awide variety of upland receptors. Runoff from the site flows to the adjacent drainage ditch, though water in the ditch infiltrates and does not flow off-site. No significant surface water is present near the site, mitigating potential groundwater to surface water contaminant migration.

The results of 1993 SI and 1995 RI indicate that concentrations of metals are present in site soils and in the drainage ditch that pose significant potential risk to ecological receptors. However, these potential risks are mitigated by several factors. First of all, Site 27 is small, limiting significant receptor use. Second, the drainage ditch contains no standing water and no aquafic habitat. Only terrestrial receptors would come into contact with the ditch, but are not expected to significantly use the area since no habitat is present. Furthermore, water in the ditch, present only after heavy rainfall, tends to infiltrate rather than flow off-site, and no surface water is present near the site. Therefore, contaminant migration downstream or contaminant contributions to the watershed appear to be negligible.For these reasons, further ecological study at Site 27 appeared to be unwarranted, but removal of paint chips and associated soils, and limited removal of ditch sediments appeared to be appropriate.

Summary of Risks

Risks identified in the pre-remediation human health risk assessment and ecological risk screening have been addressed by the soil removal performed at Site 27. The contaminated surface soil was removed and replaced by clean fill as part of the Site 27 remediation. Post-excavation confirmatory sample results indicate that lead contaminated soils were effectively removed by the remedial action. However, other metals (including arsenic, beryllium, cadmium, copper, antimony, selenium and thallium) remain at concentrations above NJDEP residential cleanup levels. Since the contaminated surface soil was removed and replaced by clean fill and top soil planted in native grasses as part of the Site 27 remediation, the potential for direct contact has been blocked. Institutional controls to ensure current industrial activities at Site 27 are not replaced by residential use have been placed in the Weapons Station Master Plan. Based on these results, no further action was taken at Site 27 and no further remedial action is necessary.

G. Site 29 - PCB Spill Site

As part of the 1995 RI, a human health risk assessmentand ecological risk assessment were performed. Tables 129 and 130 provide the selected COPCs and representative concentrations of organics in site-related subsurface soil and inorganics and organics in site-related groundwater, respectively.

Human Health Risk Assessment

Human health risk assessment was performed according to EPA guidance. The identified potential receptors have been evaluated on the basis of hypothetical future land use (residential and industrial receptors). Estimated carcinogenic risks and non-carcinogenic HQs are summarized in Tables 131 through 140.

The RME cancer risks associated with the future residential and future industrial (subsurface soil and groundwater) exposure scenarios were within the 1E-04 to 1E-06 target acceptable risk range. Iron (via ingestion of groundwater) was the principal COPC that contributed to these carcinogenic risks. PCBs, the compounds spilled at this site and the subject of this investigation, were not found in soils or groundwater at a level of concern. Minor amounts of pesticide and PCB were found during the 1992 SI field investigation at levels below NJDEP clean-up standards. Trace levels of various compounds, including PCBs, all at levels below New Jersey subsurface soil clean-up criteria, were found in the 1993 pre-construction investigations. Previous remediation of PCB-contaminated soil, performed at the time of the PCB spill appears to have been adequate to remove residual PCBs to within guideline limits.

The non-carcinogenic HQs associated with future industrial (groundwater) and future residential (groundwater) exposure scenarios exceeded 1.0; the cutoff point below which adverse effects are not expected to occur. Iron (via ingestion of groundwater) was the COPC that exceeded 1.0 for these exposure scenarios. In addition, central tendency risk estimates for residential exposure to groundwater yielded HIs greater than 1.0 for the liver and digestive system as the target organs.

Lead concentrations at the site were below EPA guideline limits and are not expected to be associated with significant increases in blood-lead levels based on the results of the IEUBK Lead Model (v. 0.99).

Risk characterization results (total RME cancer risks and total RME non-carcinogenic HIs) are presented for all potential receptors at Site 29 in Table 141 for subsurface soil and groundwater. Table 142 presents the relevant central tendency risk estimates associated with future residential receptors for groundwater.

Ecological Risk Assessment

Site 29 PCB spill area was remediated as part an immediate removal action at the time of the original spill. It contains little ecological habitat of value due to construction on the site, although forested wetand habitats are present near the site. Runoff of contaminants to the forested wetland areas is possible, but is inhibited by the developed areas around the site, and infrequent flow in the drainage swale. The spill area was small and was excavated within five days after the spill, minimizing the probability of migration. In the SI, five soil samples were taken in the area where soils were removed. Trace levels of some organochlorine pesticides, PCBs, and TPH were detected, and one elevated concentration (28,000 mg/kg) of TPH was detected. For the most part, subsurface soil samples takenduring 1995 RI activities contained low levels (below levels of concern) of the same compounds detected in the SI. A sediment sample, 16 SD 01 (and a duplicate), taken in the storm drain east of Site 29 and south of Site 16, represents the only potential overland runoff pathway to the wetlands east of Site 29. No PCBs were detected in 16 SD 01 or its duplicate. With the exception of a few slightly elevated detections for some metals, 1995 RI groundwater samples indicated that impacts to groundwater at the site were minimal, and no PCBs or organochlorines were detected. Any residual PCBs, or organochlorine pesticides and petroleum hydrocarbons, detected at the site are not expected to significantly migrate via overland runoff or infiltration due to their strong affinity for organic fractions in soils and sediments, nor is there evidence that they may have migrated before they were removed, because of the quick and apparently adequate removal response.

Since risk numbers would be mitigated by the factors mentioned above, quantitative ecological risk assessment at Site 29 was not applicable. For these reasons, potential ecological risks from site

contaminants appear negligible, as is the potential for contaminant contributions to the Hockhockson Brook Watershed. Therefore, Site 29 was excluded from further consideration.

Summary of Risks

Based on the results of previous investigations and removal actions, no excess risk remains to human health or the environment from Site 29. Iron found in groundwater at levels above the NJDEP GWQS and the EPA MCL is not considered a realistic risk to human health. The monitoring wells are constructed with a total depth not exceeding 17 feet below ground surface (and a screened interval 10 feet above the bottom) in a generally wet area. The presence of iron in this shallow groundwater, considering the proximity to the adjacent rail yard, is not a human health concern. No further action or remediation is necessary.

VII. EXPLANATION OF SIGNIFICANT CHANGES

No significant changes from the Proposed Plan appear in this ROD for any of the sites in OU-4. At the request of NJDEP and EPA, institutional controls to limit future land use at Sites 20, 23 and 27 have been included in this ROD.

RECORD OF DECISION
NAVAL WEAPONS STATION EARLE
OPERABLE UNIT 4

PART III - RESPONSIVENESS SUMMARY

The purpose of this Responsiveness Summary is to review public response to the Proposed Plan for OU-4. It also documents the consideration of comments during the decision-making process and provides answers to any comments raised during the public comment period.

The Responsiveness Summary for OU-4 is divided into the following sections:

- **Overview** - This section briefly describes the remedial alternative recommended in the Proposed Plan and any impacts on the Proposed Plan due to public comment.

- **Background on Community Involvement** - This section describes community relations activities conducted with respect to the area of concern.

- **Summary of Major Questions and Comments** - This section summarizes verbal and written comments received during the public meeting and public comment period.

I. OVERVIEW

This Responsiveness Summary addresses public response to the Proposed Plan. The Proposed Plan and other supporting information were maintained for public review in the Administrative Record file for OU-4, which was maintained at the Monmouth County Library (Eastern Branch) in Shrewsbury, New Jersey.

II. BACKGROUND ON COMMUNITY INVOLVEMENT

This section provides a brief history of community participation in the investigation and interim remedial planning activities conducted for OU-4. Throughout the investigation period, EPA and the NJDEP have been reviewing work plans and reports and have been providing comments and recommendations, which were incorporated into appropriate documents. A Technical Review Committee (TRC), consisting of representabves from the Navy, EPA, the NJDEP, the Monmouth County Health Department, and other agencies and local groups surrounding NWS Earle, was formed. The TRClater was transformed into the Restoration Advisory Board (RAB) to include community members as well as the original officials from the

TRG, and has been holding periodic meetings to maintain open lines of communication with the community and to inform all parties of current activities.

On May 8 and 10, 1998, a newspaper notification inviting public comment on the Proposed Plan appeared in the Asbury Park Press. The public notice summarized the Proposed Plan and the no further remedial action alternative. The announcement also identified the time and location of the public meeting and specified a public comment period as well as the address to which written comments could be sent Public comments were accepted from May 4, 1998 to June 12, 1998. The newspaper notification also identified the Monmouth County Library as the location of the Administrative Record.

The public meeting was held on May 14, 1998 from 7:00 p.m. to 9:15 p.m. in Building C-54 at NWS Earle, Colts Neck, New Jersey. At this meeting, representatives from the Navy, EPA, and the NJDEP were available to answer questions concerning OU-4 and the no further remedial action alternative. The complete attendance list is included in Appendix B.

III. SUMMARY OF MAJOR QUESTIONS AND COMMENTS

A. Written Comments

General Notes:

Several comments and a marked-up draft were received from two branches of EPA Region 2 following public release of the final Proposed Plan for OU-4. Since the public comment period and public meeting date had already been established, the Navy and EPA agreed that the Proposed Plan would not be revised, but that these comments would be addressed herein.

Response to Comments received during the public meeting held at NWS Earle on May 14, 1998 to discuss the OU-4 Proposed Plan follow the response to EPA comments.

Marian Olson, EPA Region II, Program Support Branch Comments

1. The document makes many references to Risk Assessment without explaining the basic principles. The standard language on risk assessment provided in other Region II Proposed Plans should be included to provide the reader with an understanding before the terms are discussed in the document.

Response: As part of the Phase II RI, human health risk assessments and ecological risk assessments were performed where appropriate at OU- 4 sites. A four-step process is utilized for assessing site-related

human health risks for a reasonable maximum exposure scenario: Hazard identification identifies the contaminants of concern at the site based an several factors such as toxicity, frequency of occurrence, and concentration. Exposure Assessment estimates the magnitude of actual and/or potential human exposures, the frequency and duration of these exposures, and the pathways (e.g., ingesting contaminated well-water) by which humans are potentially exposed. Toxicity Assessment determines the types of adverse health affects associated with chemical exposures, and the relationship between the magnitude of exposure (dose) and severity of adverse effects (response). Risk Characterization summarizes and combines outputs of the exposure and toxicity assessments to provide a quantitative assessment of site-related risks and includes a discussion of site-specific uncertainties such as actual receptor pathways, and receptor activity patterns.

2. For Mercury Spill Area the discussion of the Hazard Index is not clear. It would be appropriate to indicate that the Agency uses a Reference Dose methodology to determine a level that is protective of the human population including sensitive subpopulations. The Hazard Quotients and Hazard Indices are compared to this value and exceedence above this value are of greater concern depending on the level of the exceedence. The language presented also does not indicate whether the Hazard Quotient for mercury has been exceeded and the exposure assumptions used in the determination. A better characterization of the assumptions and the level of exposure is required.

Response: Based on the finding that mercury concentrations in the floor sweepings was lower than the NJDEP Residential Direct Contact Soil Cleanup Level (the prevailing ARAR), a recommendation of no further action can be supported. In addition, the concentration of mercury encountered (8.6 mg/kg) compares well to an EPA screening value (7.8 mg/kg). The EPA screening value is predicated upon a calculation using a standard (conservative) exposure scenario for a future resident and a published exposure level (reference dose) known to not cause adverse effects in humans.

3. For Site 20, the Grit Blasting Area the exceedence of the New Jersey Clean-up criteria for beryllium is unclear. It appears from the statements that this criteria has been exceeded but it is unclear what the significance of this exceedence is. Under a residential scenario this would equate to a risk of approximately 1.7 E-5 and for industrial purposes the risks would be less. At a minimum the text should indicate what will be done to address the exceedence

Response: The site-specific human health risk assessment concluded there is no present or future scenario with carcinogenic risk above the target acceptable range (1.0 E-04 to 1.0 E –06). Noncarcinogenic risks were below 1 for all exposure scenarios. The marginal exceedence of the NJDEP Residential Direct Contact Soil Cleanup Criterion (1 mg/kg) in two of five samples taken (1,4 mg/kg and 2.7 mg/kg) is not considered to be an excess human health or ecological risk.

4. On page 5 the discussion for the anticipatedrisk to humans is unclear. Is the purpose of the statement to indicate that the risk is within the acceptable risk range or that there is no current or future exposure? This should be clarified.

Response: The contents of the septic tank are considered municipal-type waste and are not generally available for contact with potential receptors. There is no anticipated current or future exposure, because the contents of the tank are enclosed underground and a heavy lid covers the septic tank opening.

5. Also. on page 5 the discussion of the risk range and exceedence of the Hazard Index should indicate what these ranges are and the basis.

Response: Generally, the EPA acceptable carcinogenic risk range was considered to be 1.0 E-04 to 1.0 E-06 under an RME Scenario. Non carcinogenic health effects resulting in a hazard index less than 1 (as compared to threshold levels of the compound found to not cause adverse health effects) were considered acceptable.

6. On Site 22, the discussion of the "upper end of the EPA target acceptable risk range" should indicate how this is being defined.

Response: In this case, "the upper end of the target acceptable risk range" refers to the RME scenario and could just as well have said that under the RME Scenario there is no exceedence of the EPA guideline carcinogenic risk range.

7. For Site 23, the Paint Disposal Area at Building D-5, the discussion of the presence of thallium in four of eight samples is unclear. What are the risks associated with these values and do they exceed the NJ Criteria. For a residential scenario the non-cancer hazards associated with various thallium compounds range from 3.3 to 7.0 mg/kg. Is the meaning of this statement that the values range up to 20 mg/kg which is clearly above the Hazard Quotient of 1? This should be clarified in the text.

Response: Confirmation sampling indicated the presence of thallium at approximately the NJDEP residential contact cleanup level (2 mg/kg). The concentrations of thallium found remaining in soil after the cleanup are on the order of approximately 9 mg/kg and lower (mostly in the range not greater than 4 mg/kg). Since the remedial action included removal of soil followed by backfill and cover/revegetation of the area using clean fill, the remaining marginal exceedence for direct contact (residential) does not apply. There is no direct contact and there is no residential use anticipated.

8. For Site 27, Projectile Refurbishing Area of Building E-14 the discussion that the estimated ME risks for the future resident exposure scenariois above the upper end of the EPA target acceptable is confusing. This statement should clarify that this was evaluated in the Baseline Risk Assessment and that the removal action resulted in a risk that is within the EPA risk range.

Response: The EPA comment is quite correct. After approximately 54 tons of the contaminated soil were removed in 1996, the baseline risk assessment (performed before soil removal) no longer applies. The former risks have been mitigated.

9. The dates of the meeting and review period require modification since these have past.

Response: The meeting was held as planned.

10. On page 10, the definition of noncarcinogenic risk should indicate that “systemic health effects” may include any impact on the body that does not result in cancer i.e., changes in enzyme levels that are reversible; changes in kidney function, etc.

Response: Agree. This clarification of the definition is noted.

11. The definition of the NCP should use the appropriate title from the CFR regulation.

Response: Agree. The acronym NCP actually refers to the National Oil and Hazardous Substances Pollution Contingency Plan.

12. The term Reference dose should be defined. Similarly risk assessment should be defined for both human health and ecological risk.

Response: Reference Dose (RD) is an estimate with uncertainty spanning an order of magnitude or greater of a daily exposure level for the human population, including sensitive subpopulations, that is likely to be without an appreciable risk of deleterious effects during a portion of a lifetime.

Ecological Risk Assessment (ERA) is the process that evaluates the likelihood that adverse ecological effects may occur or are occurring as a result of exposure to one or more stressors.

Human Health Risk Assessment is the process that evaluates the likelihood that adverse human health effects may occur or are occurring as a result of exposure to one or more stressors. This process consists of five steps; data evaluation, toxicity assessment, exposure assessment, risk characterization, and uncertainty analysis.

13. Under SVOCs, atmospheric is not spelled correctly.

Response: The correct spelling is atmospheric.

Michael Poetzsch, EPA Region II, RCRA/Superfund Coordinator Comments

1. The description of Site 27 does not specify if the second removal action at the site achieved the NJDEP Residential Direct Contact Soil Cleanup Criteria. Also, the plan states that after removal activities, the area was covered with clean soil. It is not clear if the clean soil was used to cap contaminated soil or used as backfill to restore the excavation to grade level.

Response: An area of approximately 173 feet long by several feet wide by one foot deep was excavated. Although some soils in the bottom of the excavation still exceeded the NJDEP Residential Direct Contact Soil Cleanup Criteria, the placement of a foot of clean soil fill and revegetation of the disturbed area will prevent direct contact with the underlying soil. The area is currently used as an industrial site. Restrictions will be added to the facility Master Plan mentioning that use of this area must be limited in consideration of the compounds found below grade.

2. The proposed plan does not indicate where the contaminated soils from the removal actions were disposed off site (e.g., RCRA permitted facility).

Response: Soil sent off site for treatment or disposal was delivered to R-3 Technologies (Morrisville, PA) which can provide thermal treatment and recycling of non-hazardous wastes.

3. The Summary indicates that the NWSE master plan will note areas where Confirmation sampling showed metals in subsurface soil at concentrations exceeding the NJDEP direct contact soil cleanup criteria. The purpose of the notation is to trigger an evaluation of risks to future land users if the property were to be transferred. Is this notation equivalent to a notice in deed or declaration of environmental restriction? Also, since this is an active facility, standard operating procedures should be established to minimize exposure to future workers that may come in contact with these soils.

Response: The Master Plan is the Navy's primary document for identifying existing conditions and projecting future land use on a Naval facility. Natural and man-made constraints to development such as wetlands, unsuitable slopes, explosive safety distances, and aviation clear zones are identified. All Installation Restoration sites are also identified in the plan.

Any development on NWSE must be in accordance with the Master Plan or receive a specific waiver from compliance with the Master Plan. A notation in the plan that a site is constrained would forbid any development on the site unless suitable protective measures were implemented.

In the event of full or partial transfer of property, through existing legislation or through future base closure authorization, a review would be conducted to determine the suitability of any parcel for transfer of ownership. Whether or not additional remediation is required, and whether formal restrictive covenants should be included in the transfer document, would be reviewed at that time. Property transfers must comply with applicable Federal statutes, including CERCLA.

Response to EPA Region II Handwritten Comments In Marked-Up Proposed Plan Document.

1. Page 2, Paragraph 7. Replace “releases” with “sites”.

Response: Agree.

2. Page 4, Paragraph 5. “clean-up” should be one word

Response: Agree.

3. Page 5, Paragraph 4. ... should read “After the two removal actions...”

Response: "After the two removal actions" would bean accurate description for these activities.

4. Page 5, Paragraph 6. Comment asked what levels may have triggered a removal action

Response: PAHs and metals, potentially mobile in surface water runoff, may have triggered a removal action under CERCLA for protection of downstream organisms.

5. Page 6, Paragraph 3. Comment asked what levels may have triggered a removal action

Response: Metals, potentially mobile in surface water runoff, may have triggered a removal action under CERCLA for protection of downstream organisms.

6. Page 7, Paragraph 3. Comment asked what levels may have triggered a removal action

Response: Metals, potentially mobile in surface water runoff, may have triggered a removal action under CERCLA for protection of downstream organisms.

7. Page 8, Paragraph 3. Suggested slightly different wording to discuss monitoring well installations.

Response: Agree to wording changes. Existing data from nearby monitoring wells (if available) were used to develop limited conclusions regarding sites where no monitoring wells were installed specifically for that site.

8. Page 8, Paragraph 5. Has any data indicated subsurface soils where metals still exceed NJDEP direct contact soil standards? Does the Navy intend to do further sampling?

Response: At site 27 metals remain in subsurface soils at concentrations above the NJDEP Residential Direct Contact Soil Cleanup Criteria. If land use were to change dramatically from the current restricted industrial use (further encumbered by explosive safety quantity distance (ESQD) arc Navy regulations), consideration of subsurface conditions would be required. Such a land use change will be prohibited by a notation in the Master Plan. In the event of full or partial transfer of property, through existing legislation or through future base closure authorization, a review would be conducted to determine the suitability of any parcel for transfer of ownership. Whether or not additional remediation is required, and whether formal restrictive covenants should be included in the transfer document, would be reviewed at that time. Property transfers must comply with applicable Federal statutes, including CERCLA.

B. Public Meeting Comments

1. After showing a video and presenting a concise summary of the status of each of the eight OU-4 sites, Greg Goepfert asked if there were any specific comments for the record.

2. Robert Marcolina, of New Jersey DEP, mentioned that NJDEP had submitted comments in writing on

the Draft Proposed Plan some weeks or months earlier, and was satisfied with the changes (mainly simplifications) in the level of detail presented in the final version of the Proposed Plan.

3. Mr. Marcolina and Mr. Goepfert discussed the Navy procedure/policy for restricting future land use. Mr. Goepfert explained that there is no "deed" for the Navy facilities in question, therefore no deed restrictions can be placed. The Navy uses the formal Master Plan for this purpose. Mr. Marcolina, having discussed the issue with the Navy at length previously, was satisfied with the Navy's approach. The Navy will use the facility Master Plan to record existing site conditions that should be considered at some future time if planned land use were to change dramatically from industrial to residential or other use.

4. Merwin Kincade, of the Tinton Falls Environmental Commission, agreed that the use of a restriction noted on the facility Master Plan seems to be equivalent to a formal “deed" restriction filed requiring notification of the DEP and the local health department if land use were to change.

5. John Kolicius, the Navy remedial project manager, confirmed discussions regarding the use of restrictions noted on the facility Master Plan, and noted that restrictions in question apply only to potential residential direct contact. None of these areas are residential. Major changes, involving overcoming multiple restrictions, would be required to convert any of the areas to residential use.

6. Mr. Kolicius noted that EPA, like NJDEP, had also commented in writing on the earlier Draft Proposed Plan. EPA comments were similar to the NJDEP comments suggesting less volume of detail be included. Sharon Jaffess, the former EPA project manager, worked very closely with the Navy to summarize the work performed and to prepare the final Proposed Plan for OU-4.

7. Mr. Goepfert noted that the open comment period would continue through June 12, 1998. The Proposed Plan is in the Library (document repository) and written comments should be sent to Mr. Goepfert or Mr. Kolicius.

ROD FACT SHEET

SITE

Name :Naval Weapons Station Earle
Location/State :201 Highway 34 South, Colts Neck, New Jersey

EPA Region :Region II
HRS Score (date):37.21 (8/30/90)
Site ID # :NJO170022172

ROD

Date Signed: September 28, 1999
Remedy/ies: (containment, bioremediation, etc.)No further action
Operating Unit Number: OU-4
Capital cost: $0
Construction Completion: N/A
O & M: N/A
Present worth: N/A

LEAD

EPA Enforcement*
Primary contact: Jessica Mollin (212-637-3921)
Secondary contact: Bob Wing (212-637-4332)
Main PRP(s): Naval Weapons Station Earle (NWSE)
PRP Contact: John Kolicius (610-595-0567 ext. 157)

*Note: NWSE is the remediation lead since they are a federal facility

WASTE

Type: Metals, PCBs, SVOCs, pesticides
Medium: soil
Origin: spills, dumping, pistol ranges
Est. quantity: unknown